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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/555,668

12/21/2005

Tadahiro Ohmi

039262-0144

9889

22428 7590 11/16/2007

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EXAMINER

BLAN, NICOLE R

ART UNIT

PAPER NUMBER

1792

MAIL DATE

DELIVERY MODE

11/16/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/555,668	<b>Applicant(s)</b> OHMI ET AL.	
	<b>Examiner</b> Nicole Blan	<b>Art Unit</b> 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 07 November 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 November 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>03272006</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 4-5, and 7-10 are rejected under 35 U.S.C. 102(e) as being anticipated by Shen et al. (U.S. Patent 6,797,188, hereafter '188).

Claim 1: A method of cleaning a substrate processing apparatus [col. 1, lines 32-35 and 53-54; col. 2, lines 11-14] comprising:

a processing container defined by an outer wall [(28), Fig. 1, col. 2, lines 66-67];

a holding stage [(32), Fig. 1, col. 5, lines 20-21 and 43] connected to a high-frequency power supply [(54), Fig. 1, col. 5, lines 45-47] [(54) is within (52 which is within (32); therefore it's connected] and provided in said processing container for holding a processing substrate [see Fig. 1];

an exhaust port for evacuating the inside of said processing container [(42), Fig. 1, col. 5, lines 27-30];

a microwave transmissive window [col. 5, lines 22-26; see Fig. 1 - the showerhead would be mounted to the top of the chamber and face down toward the substrate] provided on said processing container as part of said outer wall so as to face said processing substrate;

a microwave antenna [(48), Fig. 1, col. 5, lines 33-39] provided on said microwave transmissive window [see above] and electrically connected to a microwave power supply [(46), Fig. 1, col. 5, lines 33-39];

a plasma gas supply portion [col. 5, lines 22-26] for supplying a plasma gas into said processing container; and

a process gas supply portion [(36), Fig. 1, col. 5, lines 22-23] provided between said processing substrate on said holding stage [(32), Fig. 1] and said microwave transmissive window [see above] so as to face said processing substrate [refer to Fig. 1], said method comprising:

a gas introducing step of introducing a cleaning gas into said processing container [col. 5, line 22];

a plasma exciting step of introducing a microwave into said processing container from said microwave antenna to thereby excite a plasma in said processing container [col. 5, lines 5-14 and 33-39]; and

a bias applying step of applying a high-frequency power to said holding stage from said high-frequency power supply [col. 5, lines 5-14 and 45-47].

Claim 4: The method according to claim 1, wherein said cleaning gas contains oxygen [col. 4, line 67].

Claim 5: The method according to claim 1, wherein said cleaning gas contains hydrogen [col. 3, lines 49-53].

Claim 7: The method according to claim 1, wherein said cleaning gas contains a fluorine compound [col. 3, lines 14-22].

Claim 8: The method according to claim 1, wherein said cleaning gas is introduced from said plasma gas supply portion [showerhead, see claim 1] provided between said microwave antenna [(48), Fig. 1, see claim 1] and said process gas supply portion [(34), Fig. 1, see claim 1].

Claim 9: The method according claim 1, wherein said cleaning gas is introduced from said process gas supply portion [feeds from supply portion to showerhead and turns into plasma; refer to claim 1].

Claim 10: The method according to claim 1, wherein said cleaning gas is dissociated by said microwave plasma and a high-frequency plasma excited by said high-frequency power [col. 5, lines 22-26 and 33-47] so as to be reactive species, and a deposit deposited inside said processing container is etched by said reactive species so as to be removed [col. 2, lines 27-29; col. 3, lines 14-24].

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over '188 as applied to claim 1 above, and further in view of Ishii et al. (U.S. PGPub 2002/0050486, hereafter '486).

Claim 2: '188 teaches the limitations of claim 1 above. It remains silent with respect to said process gas supply portion is made of a conductive material and grounded. However, '486 teaches that the process gas supply portion is made of a conductive material and grounded [page 5, paragraph 73]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the gas supply out of a conductive material and ground it to prevent electrostatic shock from forming and potentially harming personnel.

6. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over '188 as applied to claim 1 above, and further in view of Ishii et al. (U.S. PGPub 2001/0035130, hereafter '130).

Claim 3: '188 teaches the limitations of claim 1 above. It remains silent with respect to wherein said microwave antenna is power-fed through a coaxial waveguide and comprises an antenna body having an opening portion, a microwave radiating surface having a plurality of slots and provided on said antenna body so as to cover said opening portion, and a dielectric provided between said antenna body and said microwave radiating surface. However, '130 teaches a microwave antenna [sheet 1 - area between (50) and (62)] is power-fed through a coaxial waveguide [sheet 1 - (52)] and comprises an antenna body [sheet 1 - (54)] having an opening portion, a microwave radiating surface [sheet 1 - (60)] having a plurality of slots [sheet 1 - (62)] and provided on said antenna body so as to cover said opening portion, and a dielectric [sheet 1 - (66)] provided between said antenna body and said microwave radiating surface [page 3, paragraph 44]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the antenna system disclosed by '130 in the method of '188 with a

reasonable expectation of success because '130 teaches that it is a suitable system to distribute a uniform plasma in the processing container to accomplish an even processing on a large-diameter wafer [abstract].

7. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over '188 as applied to claim 1 above, and further in view of Au et al. (U.S. PGPub 2001/0010228, hereafter '228).

Claim 6: '188 teaches the limitations of claim 1 above. It remains silent with respect to the cleaning gas containing H<sub>2</sub>O. However, '228 teaches a cleaning gas containing H<sub>2</sub>O [page 1, paragraph 7]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use H<sub>2</sub>O cleaning gas as disclosed in '228 in the cleaning method of '188 with a reasonable expectation of success because '228 teaches that it is a suitable gas used to clean the walls within the chamber [page 1, paragraphs 1 and 7].

8. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over '188 as applied to claim 1 above, and further in view of Akahori et al. (U.S. PGPub 2002/0047203, hereafter '203).

Claim 11: '188 teaches the limitations of claim 1 above. It remains silent with respect to the deposit containing a fluorine-added carbon film. However, '203 teaches a deposit containing a fluorine-added carbon film [page 2, paragraphs 39-40 and 44-45]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a fluorine-added carbon film as disclosed in '203 in the method of '188 with a reasonable expectation of success because '203 teaches that it is a known material in semiconductor fabrication and that it is required to etch away the material [e.g. cleaning] when fabricating semiconductors.

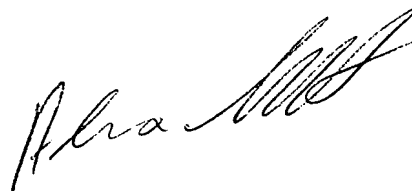
***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nicole Blan whose telephone number is 571-270-1838. The examiner can normally be reached on Monday - Thursday 8-5 and alternating Fridays 8-4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on 571-272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

NRB



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PRIMARY EXAMINER